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10/076,049	02/13/2002	Osamu Nabeta	M1971-107	8629

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EXAMINER	
DOTE, JANIS L	
ART UNIT	**PAPER NUMBER**
1756	4

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

A8-11

Office Action Summary

Application No.	Applicant(s)
10/076,049	OSAMU et al
Examiner	**Group Art Unit**
J. DOTE	1756

—The MAILING DATE f this communication appears on the cover sheet beneath th correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 6/30/03; 8/12/03

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-14 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-14 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Appli ation Papers

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☒ All ☐ Some* ☐ None of the:

☒ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 10

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other _____

Office Action Summary

1. The examiner acknowledges the amendments to claims 1, 3, and 4, and the addition of claims 8-14 filed in Paper No. 9 on Jun. 30, 2003. Claims 1-14 are pending.

2. The examiner deleted the indication that English translations of the Japanese patents were provided from the form PTO-1449 filed in Paper No. 10 on Aug. 12, 2003. Applicants did not provide translations of the patents, but only provided English-language abstracts describing said patents. The examiner has corrected the form PTO-1449 to indicate that English abstracts were provided.

3. The objection to the abstract set forth in the office action mailed on Feb. 28, 2003, Paper No. 8, paragraph 1, has been withdrawn in response to replacement abstract filed in Paper No. 9.

The rejection of claims 3 and 4 under 35 U.S.C. 112, second paragraph, set forth in Paper No. 8, paragraph 4, has been withdrawn in response to the amendments to claims 3 and 4.

The rejections of claims 1-7 under 35 U.S.C. 112, second and first paragraphs, set forth in Paper No. 8, paragraphs 5 and 7, respectively, have been withdrawn in response to the amendment to claim 1.

4. The examiner notes that following term is a means-plus-function limitation covered by the 35 U.S.C. 112, sixth paragraph: "means for electrophotography processing that are placed on the periphery of said photosensitive body." The specification at page 13, lines 3-5, recites "means for electrophotography processing, such as charging, light exposure, developing, transferring, cleaning, and the like." The only definition of such means is provided by instant Fig. 3 and equivalents thereof. Fig. 3 comprises a charging device **35**, a light exposure system **36**, a developing system **37**, a transfer system **39**, a cleaning system **43**, and a charge removal system **44**. The specification further discloses that the transfer system comprises an intermediate transfer belt **40** and a transfer device **41**. See the instant specification at page 31, lines 17-22, and Fig. 3.

Applicants in Paper No. 9 urges that the citation to page 31, lines 17-22, of the instant specification, contradicts the examiner's previous statement that the "only definition" for the "means for electrophotography processing" is provided by instant Fig. 3 and equivalents thereof.

However, the disclosure at page 31, lines 17-22, of the specification, merely identifies the reference labels in Fig. 3. In other words, the disclosure describes or defines the

components in Fig. 3. Thus, contrary to applicants' comment, the disclosure at page 31 does not contradict the examiner's earlier statement that the "only definition" for the "means for electrophotography processing" is provided by instant Fig. 3 and equivalents thereof.

Applicants further assert that the "means for electrography processing" is also described at page 31, lines 2-16, page 11, lines 19-25, and page 12, lines 1-12, of the specification. Applicants request that the examiner acknowledge the additional descriptions of said means.

However, the specification at page 31, lines 2-16, describes only the photosensitive body. There is no description of the "means for electrophotography processing." The specification at page 11, lines 19-25, and page 12, lines 1-12, merely mentions said "means." There is no definition or description of the "means for electrophotography processing" at said pages. Accordingly, there is no basis on which the examiner can honor applicants' request.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 8 are indefinite in the phrase "belt-type photosensitive body" (emphasis added) because it is not clear what is the scope of term "belt-type." It is not clear whether the photosensitive body is a photosensitive belt or whether it merely has some (unspecified) properties of a photosensitive belt.

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1-4 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,629,117 (Katsukawa) combined with Diamond, Handbook of Imaging Materials, pages 395-396, and US 5,737,669 (Ring).

Katsukawa discloses a positively charged single-layer photosensitive member comprising a conductive support and a photosensitive layer that is within the compositional limitations recited in instant claims 1-4 and 8-11. The photosensitive layer comprises 5 parts by weight of titanyl phthalocyanine, 30 parts by weight of an electron transport material, 50 parts by weight

of a particular benzidine compound as the hole transport material, and 100 parts by weight of the polycarbonate Z resin (2-2), which has a viscosity-average molecular weight of 20,000 to 25,000. See the polycarbonate Z resin (2-2) at col. 8; examples 327, 335, 343, 351, and 359 in Tables 48 through 52, respectively; and col. 55, line 36, to col. 56, line 6. The viscosity-average molecular weight of 20,000 to 25,000 is within the range of 20,000 or greater recited in instant claims 2 and 9. Polycarbonate Z resin (2-2) is present in an amount of 54% by weight of the total weight of the photosensitive layer. (The weight percentage was determined from the amounts used in the examples.) The weight percentage of 54% is within the range of 40 to 70% recited in instant claims 2 and 9. Katsukawa discloses that its photosensitive member has superior mechanical strength and repeat characteristics. Col. 1, line 65, to col. 2, line 1. The photosensitive member also has a high sensitivity and a high glass transition temperature. Col. 2, lines 1-2.

Katsukawa does not exemplify the use of an endless conductive flexible substrate as recited in the instant claims. However, Katsukawa does not limit the type of conductive substrate used. Katsukawa discloses that the "[a]s the conductive substrate . . . various materials having conductivity can be used." Col. 26, lines 22-26. Katsukawa also discloses that the conductive substrate may be in the form of a sheet, and

that the substrate may be "plastic materials vapor-deposited or laminated with . . . metal." Col. 26, lines 28-30 and 33.

As shown in Diamond, it is well-known in the art that an image loop (i.e., endless belt) can be fabricated from a flexible web comprising a conductive layer and a photoreceptor layer where the ends of the web are joined together to form an endless belt. Diamond, page 396, lines 4-5. The photoreceptor layer may be a single layer. Page 395, line 27.

According to Ring, the laser or LED-array printer comprising a photoreceptive image-carrying drum has several disadvantages. See Ring, col. 1, line 36, to col. 2, line 9. For example, Ring teaches that "the drum . . . and the [other] elements positioned adjacent the drum surface are relatively large elements since they all must be at least as wide as a sheet of a printing medium, on the order of 8.5 to 12 inches or larger." Col. 1, lines 37-42. Ring also discloses that "if an LED-array head is employed . . . the head must be at least as wide as the drum . . . so that an electrostatic image is formed on the drum surface during a single pass of the drum." Ring discloses that "if a laser is employed, relatively sophisticated mirrors and/or prisms must be employed for the same purpose." The "relatively long LED-array head or the lasers and related optical devices represent a significant portion of the cost of producing the drum printer." Col. 1, lines 46-55. To overcome these disadvantages,

Ring discloses a small-scale and inexpensive electrophotographic printer comprising a photoreceptive member in the form of an endless belt **20** stretched over rollers **26a** and **26b**. Fig. 2; col. 4, lines 20-36; and col. 4, line 50, to col. 5, line 52. According to Ring, its electrophotographic printer requires a relatively short LED array and can form multichrome or color images at a relatively low cost. Col. 9, lines 39-45.

It would have been obvious to a person having ordinary skill in the art, in view of the combined teachings of Katsukawa, Diamond, and Ring, to use a flexible web support coated with a conductive layer as taught by Diamond and Katsukawa as the conductive support in the positively chargeable single organic photosensitive member taught by Katsukawa, and to form an endless belt from the resulting photosensitive member as taught by Diamond. That person would have had a reasonable expectation of successfully obtaining an endless flexible positive charged single layer photosensitive member having the properties disclosed by Katsukawa that is capable of being used in a small-scale electrophotographic printer as taught by Ring that is capable of providing multichrome and color images at a relatively low cost.

Applicants' arguments filed in Paper No. 9 have been fully considered but they are not persuasive.

Applicants assert that there is no motivation to combine the teachings of Katsukawa with those of Diamond and Ring. Applicants argue that Katsukawa does not teach the use of an endless flexible support, and stresses that the conductive support have sufficient mechanical strength at col. 26, lines 35-36. Applicants further argue that Diamond and Ring do not provide guidance as to the particular components used in the photosensitive layer. Applicants assert that because Katsukawa discloses "17 possible charge generating materials," "[t]he skilled artesian is provided no guidance as to which of these 17 possible charge generating materials should be selected for use on a flexible support body."

Applicants have mis-characterized Katsukawa. As discussed in the above rejection, in examples 327, 335, 343, 351, and 359 of Katasukawa, Katsukawa exemplifies positively charged single-layer photosensitive members that are within the compositional limitations recited in instant claims 1-4 and 8-11, but for the presence of the conductive flexible support body recited in the instant claims. See Tables 48 through 52. All of the those exemplified single-layer photosensitive members comprise titanyl phthalocyanine. Moreover, Katsukawa at col. 23, line 65, to col. 24, line 11, teaches the advantages of using oxotitanyl phthalocyanine and X-type metal-free phthalocyanine. Furthermore, Katsukawa shows that the single-layer photosensitive

layers in those exemplified members have superior mechanical strength and "repeat characteristics" and high sensitivity. See Tables 48 through 52, examples 327, 335, 343, 351, and 359. Thus, Katsukawa clearly teaches a positively charged single-layered photosensitive layer as recited in the instant claims.

In addition, Katsukawa, at col. 26, lines 35-36, discloses that "[i]t is preferred that the conductive substrate has a sufficient mechanical strength when used" (emphasis added). In other words, Katsukawa discloses that such a conductive substrate is preferred, not a requirement, as alleged by applicants. As discussed in the rejection, Katsukawa does not limit the type of conductive substrate used in its photosensitive member, and discloses that the conductive substrate can be a plastic material vapor-deposited on or laminated with a metal. Diamond teaches that the use of conductive flexible endless belts that comprise a flexible web coated with a conductive layer as conductive substrates in electrophotographic photosensitive members is well-known in the art. Ring teaches the advantages of using photosensitive members in the form of an endless belt over photosensitive members in form of drums. Thus, the combined teachings of Diamond and Ring provide reason, motivation, and suggestion to a person having ordinary skill in the art to use a conductive flexible substrate as recited in the instant claims as the conductive substrate in the single-layer photosensitive

member disclosed by Katsukawa, and to form an endless flexible photosensitive belt from the resulting single-layer photosensitive member. Accordingly, for the reasons discussed in the rejection, the combined teachings of Katsukawa, Diamond, and Ring render the instantly claimed photosensitive member prima facie obvious.

9. Claims 1, 5, 7, 8, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,198,889 B1 (Yu) combined with European Patent 574,154 A1 (EP'154).

Yu discloses an electrophotographic copying apparatus comprising an endless flexible electrophotographic photoreceptor belt **10** which is stretched over a plurality of cylindrical rollers **12, 14, 16,** and **18**, a charging station **31**, an image exposure station **33**, and image development stations **41**, **42**, **43**, and **44**, cleaning station **22.** See Fig. 2, and col. 8, lines 44-65. Yu further discloses that generally small diameter support rollers having a diameter of 1.9 cm (i.e., 19 mm) are used for simple, reliable copy paper stripping systems in an electrophotographic imaging apparatus using a photoreceptor belt system operating in a very confined space. Col. 3, lines 1-6. The other components besides the endless belt are arranged on the periphery of the endless belt. See Fig. 2. The other components

meet the "means" limitation recited in instant claims 5 and 8 because they are used in forming an image by an electrophotographic process. The diameter of 19 mm is within the range of 5 mm to 20 mm recited in instant claim 5. Yu exemplifies an endless flexible belt comprising a biaxially oriented thermoplastic polyester coated with titanium. See example 1 at col. 12.

Yu does not exemplify an endless flexible photoreceptor belt comprising a single photosensitive layer as recited in the instant claims.

EP'154 discloses the disadvantages of using dual-layer photoconductive layers comprising a charge generation layer and a charge transport layer. Accordingly to EP'154, the charge transport layers are required to have high carrier mobility and usually comprise hole transport materials. The photoconductors comprising said dual-layer photoconductive layer are negatively charged by a negative corona discharge, which produces a large amount of ozone due to a reaction with oxygen in the ambient air. Page 2, lines 17-21. The ozone leads to environmental contamination and degradation of the photoconductors. Page 2, lines 21-22. EP'154 discloses that single-layer photoconductive layers including electron transport materials can be easily produced and have a number of advantages in the prevention of coating defects and improvement of optical characteristics of the

photoconductor. Page 2, lines 39-41. EP'154 discloses a single positively charged photosensitive layer that is within the compositional limitations recited in instant claims 1 and 8. The photosensitive layer comprises 3 parts by weight of titanyl phthalocyanine, 50 parts by weight of a particular electron transport material, 50 parts by weight of a hole transport material, and 100 parts by weight of a polycarbonate resin. Page 9, lines 24-25; page 10, lines 21-26; and example 9 in Table 1 at page 11. EP'154 discloses that its single positively charged photosensitive layer has extremely low residual potential and excellent sensitivity. Said photosensitive layer also can used in a rapid operation of a copying machine, a printer, or the like. Page 3, lines 4-50. EP'154 does not exemplify the use of an endless flexible substrate as recited in the instant claims. However, EP'154 does not limit the type of conductive substrate used. EP'154 discloses that the "[a]s the conductive substrate . . . various conductive materials can be used." Page 8, lines 36-37. EP'154 also discloses that the conductive substrate may be a plastic material vapor-deposited on or laminated with a metal. Page 8, lines 39-40.

It would have been obvious to a person having ordinary skill in the art, in view of the combined teachings of EP'154, to use the single positively charged photosensitive layer disclosed by EP'154 as the photosensitive layer in the endless flexible

photoreceptor belt in the apparatus disclosed by Yu, because that person would have a reasonable expectation of successfully obtaining an electrophotographic apparatus that does not produce ozone and has excellent sensitivity.

Applicants' arguments filed in Paper No. 9 have been fully considered but they are not persuasive.

Applicants assert that there is no motivation to combine the teachings of Yu with that of EP'154. Applicants argue that EP'154 does not teach a "belt-type photosensitive body," but "envisions use of 'an ordinary aluminum tube.'" Applicants assert that the "examiner requires the person of ordinary skill to combine a reference teaching the drum-type photosensitive body of EP'154, with a process (Yu) that exclusively uses belt-type photosensitive bodies."

Applicants have mis-characterized EP'154. Although EP'154 at page 8, lines 14-43, discloses that "an ordinary aluminum tube . . . can be used" as the conductive substrate. As discussed in the above rejection, EP'154 does not limit the type of conductive substrate used in its photosensitive member. As noted by applicants, EP'154 exemplifies single-layered photosensitive members comprising aluminum foil as the conductive substrate. As discussed in the rejection, EP'154 teaches the advantages of using its single-layered photosensitive layer over the conventional dual-layer photosensitive layers. These advantages

taught by EP'154 provide reason, motivation, and suggestion to a person having ordinary skill in the art to use EP'154's single-layer photosensitive layer as the photosensitive layer in the endless flexible photoreceptor belt disclosed by Yu. The substitution of one known photosensitive layer for another photosensitive layer would have been obvious to a person having ordinary skill in the art absent some teaching that the particular combination of substrate and photosensitive layer was critical. Applicants have pointed to no such evidence in the record. Accordingly, the combined teachings of Yu and EP'154 render obvious the instantly claimed photoreceptor and apparatus.

10. Claims 6 and 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art of record does not teach or suggest an imaging apparatus comprising an endless flexible single-layer photosensitive body stretched with a tension of 50 N/cm per unit length of the width of the photosensitive body over a plurality of cylindrical rollers as recited in instant claims 6 and 13. Nor is there enough information on the present record to determine whether the photosensitive belt disclosed by the prior art has a tension of 50 N/cm per unit length of the width of the

belt when stretched over a plurality of rollers as recited in instant claims 6 and 13.

11. Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (703) 308-3625. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (703) 308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 (Rightfax) for after final faxes, and (703) 872-9310 for other official faxes.

Any inquiry of papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Palestine Jenkins, whose telephone number is (703) 308-3521.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JANIS L. DOTE
PRIMARY EXAMINER
GROUP ~~1500~~ 1700

JLD
September 18, 2003